CLAIMS

What is Claimed is:

1. A method of forming a metastable mineral complex comprising:

(a) mixing a mineral in the form of an oxide, a hydroxide, or a carbonate, an amino acid that is acidic or neutral and an organic acid in an aqueous medium to form a solution, wherein the molar ratio of mineral/amino acid/organic acid is 1.0 mole mineral/about 0.5 to less than 2.0 mole amino acid/ about 0.01 to about 0.7 mole organic acid; and

(b) rapidly drying the solution of step (a) to obtain a solid water-soluble material.

2. The method of claim 1, wherein the molar ratio of mineral/amino acid/organic acid is 1.0 mole mineral/about 1.0 to less than 2.0 mole amino acid/ about 0.05 to about 0.5 mole organic acid.

3. The method of claim 2, wherein the solution is rapidly dried using spray drying or freeze drying.

4. The method of claim 3, wherein the amino acid is aspartic acid or glutamic acid.

5. The method of claim 4, wherein the mineral is calcium.

6. The method of claim 4, wherein the mineral is magnesium.

7. The method of claim 4, wherein the organic acid is citric acid or acetic acid.

8. The method of claim 4, wherein the solution is at a pH of about 2.0 to about 7.0.

9. The method of claim 1, wherein the solution is at a pH of about 2.0 to about 7.0; the temperature of the solution prior to drying is maintained at about 0 to about 50°C; and the mineral is present in the solution at between about 1.0 mg/mL and about 12.0 mg/mL.

10. A metastable mineral complex produced by the method of claim 1.

11. A food or beverage comprising the metastable complex of claim 10.

12. A method of fortifying a food, comprising adding to the food the metastable mineral complex of claim 10.

13. A composition comprising a mono-, di-, or trivalent cationic mineral in a metastable complex with an amino acid that is acidic or neutral, wherein:

(a) the composition is in the form of a dry powder; and

(b) the mole ratio of the mineral to the amino acid is 1.0 mole mineral: about 0.5 to less than 2.0 mole amino acid.

14. The composition of claim 13, wherein the mole ratio of the mineral to the amino acid is 1.0 mole mineral/ about 1.0 to less than 2.0 mole amino acid.

15. The composition of claim 13, wherein the acidic amino acid is aspartic acid or glutamic acid.

16. The composition of claim 13, wherein the mineral is magnesium and the amino acid is an acidic amino acid.

17. A method of fortifying a food, comprising adding to the food the composition of claim 13.

18. The method of claim 17, wherein the mineral in the metastable complex is magnesium or calcium and the amino acid in the metastable complex is aspartic acid or glutamic acid.

19. A food comprising the composition of claim 14.

20. The food of claim 19, wherein the mineral in the metastable complex is magnesium or calcium and the amino acid in the metastable complex is aspartic acid or glutamic acid.